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FIRST

ANNUAL ANNOUNCEMENT

OF THE

Wagner Free Institute of Science,

FOR THE

COLLEGIATE YEAR 1855–56.

HALL OF THE INSTITUTE,
NORTH WEST CORNER 13th AND SPRING GARDEN STREETS,
PHILADELPHIA.

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1855.

TRUSTEES.

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GEORGE M. KEIM, Esq.

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JOSHUA O. COLBOURN,
Professor of Astronomy.

_____ _____*
Professor of Natural Philosophy.

_____ _____*
Professor of Agricultural Chemistry.

_____ _____*
Professor of Mechanical Engineering.

* Professorship to be filled.

AN ACT

TO

INCORPORATE THE TRUSTEES

OF THE

WAGNER FREE INSTITUTE OF SCIENCE.

Whereas it is represented to the Legislature of Pennsylvania, that William Wagner of the City of Philadelphia, has large collections of specimens of geology, mineralogy, organic remains, botany and conchology, of great value, which he has made through a series of years; and that he is desirous of placing them with the cabinet, edifice and lot of ground, in the hands of Trustees to establish an institution of science: Therefore

Section 1. *Be it enacted* by the Senate and House of Representatives of the Commonwealth of Pennsylvania, in General Assembly met, and it is hereby enacted by the authority of the same:

That William H. Allen, President of Girard College, James Bryan, M.D., Robert E. Peterson, George M. Keim and William Wagner, all citizens of Pennsylvania, the latter of whom shall be president for life, and their successors forever shall be and are hereby constituted a body politic and corporate, under the name and style and title of the Trustees of the Wagner Free Institute of Science, and by the same name shall have perpetual succession, and in case of death, resignation, or removal from the State of Pennsylvania, of either of the said Trustees, shall elect his successor, and they shall have power to increase their number to nine if it shall be thought necessary, and they shall have power to appoint such officers as the wants of the Institution may require.

Section 2. That the object of this Institution shall be the gratuitous instruction in the Natural Sciences, such as Geology, Mineralogy, Metallurgy, Mining, Botany, Chemical Agriculture, with their application to the arts and other kindred sciences, to all persons conforming to the rules of the Institution; and the President and Professors, or a majority of them, shall constitute the Faculty of the Institute, which Faculty shall have the power of enforcing the rules and regulations adopted by the Trustees for the government of the students.

Section 3. That it shall have a common seal, and change the same at pleasure, make contracts relative to the same Institution, to sue and be sued, and by that name and style, be capable in law of purchasing, holding, taking and conveying any estate, real, personal or mixed, for the use of said corporation, of whatsoever kind, nature or quality soever, by gifts, grants, bargain, sale, assurance, will, devise or bequest, from any person or persons capable of making the same: *Provided,* That the same do not exceed the yearly value of *Ten Thousand Dollars* over and above the gifts of William Wagner, and the same to grant, bargain, sell, devise, alter, lease or dispose of, for the use of the said Institute, and to erect such buildings as may be necessary, and generally to do all and singular the matters and things which it shall be lawful for them to do, for the well-being and ordering the affairs thereof.

Section 4. That the Trustees shall have their first meeting in the City of Philadelphia, at the Cabinet in Twenty-Third Ward, on the first day of May, one thousand eight hundred and fifty-five.

Section 5. That the Cabinet, Collection, edifice and lot of ground on which it is erected, belonging to said Institute, so long as the same shall be used for the promotion of free and gratuitous instruction, as contemplated by this Act, shall be exempted from taxation.

Section 6. That the Faculty by and with the approbation of the Board of Trustees, or a quorum thereof, shall have full power to grant degrees and diplomas in the Arts and Sciences, to such students of the Institution and others, as by their proficiency in learning, or other meritorious distinction, they shall think entitled to them.

HENRY K. STRONG,
Speaker of the House of Representatives.
WM. N. HIESTER,
Speaker of the Senate.

Approved the ninth day of March, one thousand eight hundred and fifty five.

JAMES POLLOCK.

(L. S.)

Secretary's Office, Harrisburg, March 9, 1855.

I do hereby certify that the above and foregoing, is a true and correct copy of the original Act of the General Assembly, as the same remains in file in this office. *In testimony whereof,* I hereunto set my hand, and caused to be affixed the seal of Secretary's Office, the day and year above written.

JOHN M. SULLIVAN,
Deputy Secretary of the Commonwealth.

ANNOUNCEMENT.

The Trustees of the Wagner Free Institute of Science, deem the present period appropriate to give the recent history of the establishment of the Institution under their charge, and an exposition of the plans and purposes for its future operations. Its origin has been due entirely to the exertions of Professor William Wagner. For many years past he has been engaged in making collections of rare and valuable minerals, of natural geological illustrations, of organic remains belonging to all former periods of the world's history, and of recent conchological specimens giving a complete view of that department of animals now alive. His conservatory of living plants is large and valuable, and, with his dried herbarium, embraces many thousand specimens. Beside all these, he has made a beginning of cabinets in other departments of natural history, and he has laid the foundation of a library of books on the natural sciences. In making these large collections, he has travelled many thousand miles in Europe and Asia, as well as in our own country, and the time and pecuniary means devoted to these objects, have been considerable. To preserve these collections, he has erected buildings on his own premises in the northern border of our city; but these were regarded as only a temporary provision, being for want of room, altogether inadequate to allow a space for each specimen to be exhibited to view.

In one of these buildings he has delivered lectures during several years past on geology, mineralogy and conchology. The admission to the lectures was always free, and the number of the audience present was limited by the want of sufficient room. The attendance on these lectures was a demonstration of what might be accomplished by an institution free to all, and furnished daily with lectures of good quality, and with such striking illustrations as his own cabinets and conservatory could supply. Measures were accordingly taken by him for the opening of such an institution. On the 9th day of March, 1855, the Legislature of the State of Pennsylvania, at his request, granted a charter with ample powers for the objects in view. It provides for a Board of Trustees who are authorized to confer the usual academic degrees, as testimonials for proficiency in scientific and literary knowledge. On the first Monday in May, in pursuance of the charter, the trustees held their first meeting, and were duly organized. The city Councils, perceiving the great advantages of affording free scientific lectures daily to all disposed to hear them, wisely granted the use of Spring Garden Hall to this new Institution. The public inauguration of the Wagner Free Institute of Science, in its corporate capacity, and in the building provided by the city authorities, took place on the 21st of May. Addresses were delivered on the occasion by his Excellency JAS. POLLOCK, the Governor of Pennsylvania; by his Honor R. T. CONRAD, the Mayor of Philadelphia; by the Right Reverend ALONZO POTTER, D. D., Bishop of the Diocese of Pennsylvania; by W. H. ALLEN, LL. D., President of Girard College; by WM. NEALE, ESQ., a Truestee; Hon. ROBT. M. FOUST, of the State Legislature; and Prof. JOHN MILLINGTON, M. D.

The following paper was read, giving a concise account of the munificent donation of Professor Wagner.

Schedule of Property Donated to the Wagner Free Institute, by Prof. Wm. Wagner.

250,000 specimens of Minerals, collected from all parts of the inhabitable earth.

250,000 specimens of Geology and organic remains, of rare value to the student.

200,000 specimens of recent Shells, for the purposes of comparison with their extinct *genera*, found in the various strata of the earth's crust.

25,000 specimens of dried plants, constituting an extensive and valuable Herbarium for Botanical illustration.

Prof. Wagner's Library, Philosophical Apparatus, extensive assortment of Diagrams, illustrating Geological phenomena, Maps and Cabinet Cases.

A large lot of ground near Broad street.

At this meeting the building was filled to overflowing, and the large assembly dispersed with the most elevated anticipations, and the firmest convictions that great good was about to flow from this new and free fountain of knowledge.

The lectures began on the 28th of May, and continued every day, Sundays excepted, until the 1st of July; this being the commencement of extreme warm weather, and the usual period for summer vacation, the public exercises of the Institute were temporarily closed. The daily audiences of citizens at the lectures, numbered several hundred, and considering that what is called the lecturing season had passed, they were greater by far than the friends of the enterprise had anticipated. This was doubtless in a great measure owing to the manner in which the lectures on seven different branches of science were delivered. While they were strictly scientific both in matter and in form, they were nevertheless carefully divested of all needless technicalities, and all harsh unusual terms. This is expected always hereafter to be a characteristic of the mode of instruction in this Institute. The vigorous, transparent, and flexible English, we deem far more attractive and efficient in its native purity, than when intermingled with strange Greek and Latin words. If eloquence be the aim of the lecturer, good taste will dictate that our own free and copious native tongue affords an ampler field for grace, beauty, and grandeur of demonstration, than any unnecessary mixtures with dead and by-gone languages.

In our plans for the future, it is evident that we have a great work to do, and that it should be done thoroughly and well. We hold the fact to be demonstrated, that large audiences, as large as can be conveniently assembled in one room, will daily attend scientific lectures for nine or ten months in the year, providing only they be free, and reasonably well delivered and illustrated. The value and importance of the Natural Sciences, embracing as they do a knowledge of the vast material universe, ourselves and all that we behold around us—cannot now be denied. Our object is not so much to spend our time in proving their value, as to devise the readiest means for making them fully known, and for showing their applications to every walk of daily life. In addition to the lectures, our purpose is to furnish abundant means for the acquisition of knowledge by experimental illustrations, and by cabinets of important objects from both the natural world and the domain of art. These apparatus and cabinets in some departments we already possess, through the munificence of Professor Wagner, in a larger extent than any other educational Institution in our country. Other citizens have already contributed liberally to furnish other departments, and still others have yet to be supplied. Altogether, they are as follows:

THE COLLECTION OF MINERALS.

These are unusually full and valuable, illustrating in a grand and magnificent manner, the whole field of Mineralogy and Geology. To be appreciated they must be seen and studied; no mere description can convey an idea of their worth.

THE COLLECTION OF FOSSIL REMAINS.

These are on the same extensive scale as the preceding. Full assemblages of organic remains, both of plants and animals, illustrate the various races that are known to have flourished in all the former geological periods.

THE BOTANICAL CONSERVATORY AND THE HERBARIUM OF DRIED PLANTS.

These are also very rich, consisting of rare exotics. With the plants growing in Professor Wagner's adjoining garden, and the natural flora of the surrounding country, they already afford ample means for making accomplished botanists.

THE ZOOLOGICAL CABINETS.

At present this department consists chiefly of recent conchological specimens, which are very numerous and valuable. A beginning has been made in the several classes of the radiates, the articulates, and of the vertebrates, and we hope a rapid increase will be seen in these cabinets as soon as their wants shall be known by our citizens. Preparations to illustrate Comparative Anatomy and Physiology, we are especially desirous to procure, as these sciences are generally very inadequately taught in this country.

THE CHEMICAL LABORATORY.

This department is already partially supplied, quite fully indeed in some respects. Considerable additions, however, are still to be made, for our object is to have this important science thoroughly taught in all its branches. The ordinary elements of Chemistry, Analytical Chemistry, Organic Chemistry, and the applications of Chemistry to Agriculture, and to the useful arts, are to be demonstrated by experimental operations.

THE NATURAL PHILOSOPHY APPARATUS.

The instruments for illustrating light, heat, electricity, magnetism, the mechanical forces, and the knowledge of solids, liquids, and aeriform fluids, are in part already in our possession, but many others are still to be procured. It is hoped that from the liberality of donors, they will be supplied early during the coming autumn or winter.

THE ASTRONOMICAL INSTRUMENTS.

These for practical astronomy have not yet been obtained, nor have we buildings prepared for them; but especial attention will be bestowed, so that those individuals who attend the astronomical lectures, and who wish to become practical astronomers, may have good instrumental advantages.

THE METEOROLOGICAL OBSERVATORY.

The science of Meteorology, revealing the wonders of the atmosphere, its temperature, its humidity, its electricity, its magnetism, its currents, and its terrific disturbances as seen in storms, is now deservedly occupying much attention from the scientific world. Our object is to do all that is practicable to advance this department of knowledge, and to train up numerous intelligent and practical observers. Our instrumental means have chiefly still to be obtained, but we anticipate that, as they are not especially expensive, they will soon be supplied.

THE ETHNOGRAPHICAL AND HISTORICAL COLLECTIONS.

As the interesting questions concerning the different races of the human family, their origin, their migrations, their diversities, and the influences upon them of climate, locality, and the modes of living, must necessarily form one of the courses of lectures in a complete institution on the natural sciences, so the collection of antiquities—the reliques throwing light on the infancy of mankind—must be an object of attention. Anatomical preparations relating to the same subjects of inquiry will also be procured.

THE LIBRARY.

A beginning has been made in the collection of books on the several natural sciences, and the library possesses many important works. Its increase and completion must necessarily be the work of time.

If these extensive cabinets, as far as they are already in our possession, were so arranged that each article could be properly viewed, they would fill the entire space in Spring Garden Hall, leaving the interior of the room on the second floor for lecturing. So large a collection of the most interesting and useful objects thrown open freely for the public, should be regarded as an important acquisition to our city. But the grant of the Hall at present is merely temporary and indefinite, and hence it would be unwise to expend a considerable sum for the removal of the cabinets, and for the requisite fixtures, under the liability of having them turned out at any speedy and unexpected warning. Hence it is that the City Councils are now petitioned by several thousand of our fellow-citizens, to grant the use of that Hall for a definite time, sufficiently long to warrant the great labor and expense of putting up fixtures and removing the museum thither. It is for the public benefit, and for all classes of the public, that this petition has been made. The Trustees have no personal interest in the matter beyond that of any other citizen. Moreover, it is not a great museum alone that is thus freely offered,—it is that museum accompanied daily by the first order of scientific lectures. The Central High School sending forth its crowds of well-educated young men every year, is justly thought to be amply worth the expenditure of about $20,000 per annum, besides the use of a noble building. The Wagner Free Institute of Science can accommodate, from its extensive plans, a still larger number of students, and it asks from the city authorities only the use of a vacated building for a sufficiently lengthened time to make it warrantable to remove thither its instrumental means of instruction.

The plans for the various courses of lectures, are in a similarly extended manner as those for the cabinets and the philosophical apparatus. Every branch of the natural sciences will receive attention, and be duly taught. Their enumeration may here be given, to show the wide and useful prospects before us. 1. Astronomy; 2. Geology; 3. Physical Geography; 4. Meteorology; 5. Mineralogy; 6. Chemistry, 7. Natural Philosophy; 8. Botany; 9. Zoology; 10. Comparative Anatomy and Physiology; 11. Human Anatomy and Physiology; 12. Ethnology; 13. Mining and Metallurgy; 14. Mechanics and Mechanical Engineering; 15. Civil Engineering; 16. Agricultural Chemistry; 17. Chemistry applied to the arts.

While these sciences have each their separate spheres, they nevertheless are all inseparably connected, and form in fact but one great science. All are engaged in making known the great fabric of creation, which is one vast indivisible system, its several parts depending on each other, and interweaving and moving together in the most wonderful harmony. The field of operations for this Institution will therefore be as wide as the great creation, and as beautiful and grand as the glories that everywhere garnish the earth and the skies.

The practical application of these sciences to the useful arts, will be a prominent object. Mining, Metallurgy, Scientific Agriculture, Civil Engineering, Surveying, Navigation, Architecture, and the Mechanical and Chemical professions and trades, will each receive their share of attention. There is this difference, however, between the teaching of the sciences, and that of their applications to the several useful arts. The sciences themselves are for all—old and young, rich and poor, male or female, in every condition of life, as far as their attainment is possible; for a knowledge of the material world about us, concerns every rational individual. This knowledge is in the highest degree desirable for intellectual and moral cultivation, and for the preservation of life and health, and for innumerable practical applications to daily life, which are readily and naturally suggested to every mind. But the extensive and thorough applications of the sciences, in a technical manner, to the different chemical and mechanical trades, are quite different, these are specialities and designed for particular classes of individuals. The making of glass, the manufacture of porcelain, the tanning of leather, the formation of cements and mortars, the smelting and working of iron, the extraction of lead and zinc from their ores, are all strictly chemical operations. But a person who wishes to learn about any one of these, seldom desires to hear lectures about the others, and thus it is that the teaching of these things are specialities; and hence the audiences attending on each must be more limited than on the sciences purely. But it is an important fact that an intelligent artisan acquainted with the sciences, be his knowledge of them much or little, will readily see how to apply that knowledge to his special pursuit, without further instruction than his own reading and conversation may supply. Moreover, he will generally make original improvements himself, suggested by his theoretical intelligence, in connection with his daily practical observations and experience.

The audiences to be attracted, judging from recent experience, will be as follows:—

1. Citizens generally whose leisure may permit them to attend, either regularly or occasionally, for their improvement or amusement.
2. The youth now attending other educational institutions, both private and public. These institutions are mainly literary, and open in the morning. Here they may listen to lectures on science, and study the cabinets in the afternoon and evening.
3. Persons engaged in mechanical pursuits, who may feel the need of learning the nature of those materials which they employ in their daily operations.
4. Students of this Institution—regular matriculants—who may pursue here a course of study with a view of becoming proficients in the sciences, and who may aim at obtaining the collegiate degrees.

The lectures are each about an hour in length, and the ultimate plan of the institution is to have at least four lectures every day: the hours for their delivery are in the afternoon and evening.

When thus a view is taken of the great number of the lectures, the vitally important subjects of which they treat, the ample means for their illustration, and the large audiences of persons from different walks in life who may be accommodated and instructed, it is easy to perceive what a vast benefit this institution is calculated to impart in all future time. The founder of the Wagner Free Institute of Science has done much and nobly thus far in its behalf, and he promises to devote to it all the future energies of his life, and, at his demise, all his property. But other funds are immediately needed to endow the professorships, and by this means to secure to our city and to the world all the advantages contemplated in the plan of operations. An appeal is therefore now made to our fellow-citizens for aid. It is very desirable that funds be procured sufficient in amount for the endowment of at least six professorships and for the purchase of additional apparatus and means of instruction. The trustees believe that this appeal will be liberally responded to. So great an object, so sure and safe a means for conferring a vast amount of good immediately and through all coming time, such varied classes of individuals who may gratuitously receive the most valuable instruction, cannot fail to impress every patriotic mind favorably and deeply.

The influences of the sciences are striking as we behold them changing the face of the world. The power of steam applied on the ocean, on rivers, in factories, on railroads; the electro-magnetic telegraph, and the triumphs of civil-engineering in innumerable ways,—these are prominent instances of what has been achieved by an improved knowledge of material things. But this knowledge has been yet more effective in the contrivance and manufacture of thousands of fabrics, that cheaply and conveniently minister to the daily wants of every member of society. And yet there is a sphere in which science has been still more highly effective and beneficial. We allude to its direct effects in elevating the intellectual and moral nature of the human family. The world is no longer regarded as a level plain within narrow bounds. The great globe is revealed to our astonished view as a star rolling among countless millions of stars that glitter through the immensity of space. The most deeply affecting truths have been taught us by Geology concerning the formation and past history of our planet, and Natural Philosophy and Chemistry open to our admiring gaze the mysterious nature of matter. The other sciences, each in their turn, impart their powerful influences to the human mind. We all feel these influences when looking only at the material objects themselves, and how much more do we experience their power when through the sublime creation we extend our thoughts to the great Creator. There is an important sense in which modern science may be regarded as a new revelation—not to contradict nor to supersede the old, but immeasurably to extend and enlarge our views of the power, the wisdom, the goodness, the greatness, and the glory of the Deity.

Whether we regard the sciences in a moral, an intellectual, or a physical point of view, their great value is equally apparent. To provide for imparting them gratuitously, therefore, to every citizen in our midst, whether young or old, poor or rich, and that in the most effective and agreeable manner, we believe to be a great object, and worthy of the contributions of all who are liberally disposed. Contributions for the endowment of the professorships, and for the increase of the cabinets and philosophical apparatus, may be made either in money or in such articles as the Institute may need. The endowment of a professorship entitles the donor to give it his own or any other name.

REGULATIONS.

The collegiate year consists of nine months, beginning on the first Monday in October, and ending about the first of July. It is divided into two equal sessions.

To enter as a matriculant, evidence will be required of the possession of a good English Education, of a pure moral character, and of having attained the age of seventeen years.

The regular course of study for a matriculant will occupy two collegiate years, and an attendance at four public lectures each day. Additional private instruction under any of the professors will be considered equivalent to an attendance on a portion of the public lectures.

The student, with the advice and consent of the faculty, may make his choice of the specialities, or branches of study, he shall pursue; but at least seven specialities shall be included in the regular course of two years.

In addition to the public lectures, the professors will give private instruction; but for such services, until the endowments of the professorships shall be made, the student shall pay to each professor whose private instructions and examinations he may enjoy, the sum of $10 per session.

The degree of Bachelor of Science will be conferred at the termination of the regular course. The degree of Doctor of Philosophy will be conferred usually after an additional period of seven years, and under regulations to be hereafter announced.

No candidate for the degree of Bachelor of Science shall be considered competent in any speciality unless he shall have the certificate of the professor to whom the speciality belongs.

Students who do not pursue a regular course as candidates for degrees, may receive certificates for such proficiency as they shall have made.

The arrangements for public examinations, and for commencement exercises, will hereafter be duly announced.

TEXT-BOOKS AND WORKS OF REFERENCE.

ASTRONOMY.

Herschel's Astronomy; Gummere's Astronomy; Kendall's Uranography and Chart; Loomis' Practical Astronomy; Herschel's Observations at the Cape of Good Hope; Laplace's System of the World, and his Celestial Mechanics; Newton's Principia; Baily's Astronomical Tables and Formulas; Encyclopedia of Astronomy, by Herschel, Airy, Kater, and Barlow.

GEOLOGY.

Lyell's Elements and Principles of Geology; Mantell's Wonders of Geology, and his Medals of Creation; Buckland's Geology; Murchison's Siluria; Barrande's Silurian Strata of Bohemia; De la Bache's Geological Observer; Daubeny's Description of Active and Extinct Volcanos, of Earthquakes, and of Thermal Springs; Van Buck's Canary Isles; Darwin's Coral Reefs, Volcanic Islands, and Geology of South America; Agassiz's Fossil Fishes; Hooker's and Lindley's Fossil Flora; The Geological and Paleontological Reports of New York; Owen's Report on the North-Western Territories; Hitchcock's Report on Massachusetts; Whitney's Metallic Wealth of the United States; Morton's Cretaceous Strata; Rodgers' Report on New Jersey, and the other Separate State Reports.

MINERALOGY.

Dana's Mineralogy; Alger's Philips' Mineralogy; Brooke and Miller's Mineralogy; Taylor's Statistics of Coal.

CHEMISTRY.

Fownes Elements; Turner's Chemistry, by Rodgers; Rand's Chemistry; Kane's Chemistry; Brande's Manual of Chemistry; Graham's Elements of Chemistry; Rose's Analytical Chemistry; Noad's Analytical Chemistry; Bowman's Practical Chemistry; Fresenius's Analytical Chemistry; Will's Analytical Chemistry; Gerhardt's Organic Chemistry; Faraday's Lectures on the Nonmetalic Elements; Berzelius on the Blow-pipe; Platner on the Blowpipe; Youman's Chemical Class-book and Charts; Liebig's Chemical Treatises.

NATURAL PHILOSOPHY.

Bird's Natural Philosophy; Muller's Physics and Meteorology; Arnot's Natural Philosophy; Lardner's Natural Philosophy, First and Second Courses; Faraday's Experimental Researches in Electricity; Daniel's Introduction to Natural Philosophy; Brewster's Optics; Matteucci's Lectures; Hunt's Poetry of Science; Encyclopedia of Experimental Philosophy, by Barlow, Dunn, Roget, and Harvey.

METEOROLOGY.

Kaemtz's Meteorology; Redfield's and Hare's Papers on Storms, in the American Journal of Science and Art; Espy's Philosophy of Storms; Harris on Thunder Storms; Reid, Piddington, and Thom on Storms; Coffin's Winds of North America, in Smithsonian Contributions; Dove's Temperature Tables; Guyot's Meteorological Tables; Espy's Meteorological Reports; Arago's Meteorological Reports.

PHYSICAL GEOGRAPHY.

Berghaus' Physical Atlas, by Johnston; Maury's Physical Geography of the Sea; Guyot's Comparative Physical and Historical Geography, and his Mural Maps; Petermann's and Milner's Atlas of Physical Geography; Maury's Wind and Current, and Pilot Charts; Humboldt's Cosmos, his Views of Nature, and his Travels in Tropical America and in Central Asia; Ellet's Mississippi and Ohio Rivers; Nicollet's Mississippi River; Herndon's and Gibbon's Amazon River; Herschel's Manual of Scientific Inquiry.

BOTANY.

Coultas' Principles of Botany; Gray's Botanical Text-book; Darlington's Flora Cestrica; Gray's Botany of the Northern United States; Lindley's Vegetable Kingdom; Lindley's Introduction to the Natural System of Botany; Balfour's Class-book of Botany; Torrey's and Gray's North American Flora; Gray's Illustrated Genera of the Flora of the United States; Schleiden's Principles of Scientific Botany; Henfrey's Outlines of Structural and Physiological Botany; Loudon's Encyclopedia of Plants; Torrey's Report on the Botany of New York; Harvey's Marine Algæ of the United States, in Smithsonian Contributions.

ZOOLOGY.

Agassiz's and Gould's Elements of Zoology; Jones' Outlines of the Animal Kingdom; Cuvier's Animal Kingdom; Swainson's Natural History; Agassiz's Zoological Nomenclature; Dekay's Zoology of New York; Audubon's, Wilson's, and Bonaparte's Birds of America; Audubon's Quadruped's of America; Kirby's and Spence's Entomology; Woodward's Conchology; Sowerby's Conchology; Dana on the Crustacea of the U. S. Exploring Expedition; Dana on the Zoophytes and Corals of the U. S. Exploring Expedition.

COMPARATIVE ANATOMY AND PHYSIOLOGY.

Carpenter's Principles of General and Comparative Physiology; Bushnan's Physiology; Carpenter's Principles of Human Physiology; Kirke's and Paget's Physiology; Wagner's Comparative Anatomy of the Vertebrated Animals; Seibold's Comparative Anatomy of the Invertebrated Animals; Owen's Lectures on Comparative Anatomy.

HUMAN ANATOMY.

The Works of Cruveilheir, and of Wilson; and the Dublin Dissector.

ETHNOLOGY.

Latham's Natural History of the Varieties of Man; also his Ethnology of Europe; of the British Islands; of the British Colonies; and his Man and His Migrations; Prichard's Researches in the Physical History of Mankind; also his Natural History of Man; and his Ethnographical Maps; Pickering's Ethnology of the U. S. Exploring Expedition; Morton's Crania Americana; also his Crania Egyptica; Gallatin, Catlin, Schoolcraft, and Squire on the Aborigines of America; Wiseman's Lectures.

CIVIL ENGINEERING AND NAVIGATION.

Mahan's Civil Engineering; Millington's Civil Engineering; Gillespie's Surveying; Gummere's Surveying; Cresy's Encyclopedia of Civil Engineering; Bowditch's Practical Navigator.

MECHANICAL ENGINEERING.

Barlow's and Herschel's Encyclopedia of Mechanical Philosophy; Babbage's Economy of Machinery and Manufactures; Wyatt's Industrial Arts of the Nineteenth Century; Appleton's Dictionary of Mechanics; Nicholson's Operative Mechanic; Tredgold on the Steam Engine; Tredgold's Principles of Carpentry; Fairbairn's Application of Iron to Building; Nicholson's Encyclopedia of Architecture; Allen's Philosophy; Mechanics of Nature; Bourne's Catechism on the Steam Engine; Norris's Locomotive Engine; Bartlett's Mechanics; Steam Engine by the Artisan Clubs; Encyclopedia of Arts, Manufactures, and Machinery, by Barlow and Babbage.

AGRICULTURAL CHEMISTRY.

Thaer's Principles of Agriculture; Johnston's Lectures; Johnston's Agricultural Chemistry; Leibig's Familiar Letters on Agricultural Chemistry; Coleman's Reports on European Agriculture; Lindley's British Fruits; Downing's Fruits and Trees of America; Johnson on Fertilizers.

CHEMISTRY APPLIED TO THE ARTS.

Knapp's Chemical Technology; Ure's Dictionary on Manufactures and Mining; Vicat on Cements.

MINING AND METALLURGY.

Overman on Mining and Metallurgy; Phillip's Metallurgy; Karnsten on the Manufacture of Iron; Overman on the Manufacture of Iron; Holland's Manufactures in Metals; Comstock on the Precious Metals; Foster's and Whitney's Reports on the Copper and Iron Regions of Lake Superior.